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United States
Department of
Agriculture

**Agricultural
Research
Service**

ARS-78

June 1989

An Intravenous Cannulation Technique For Swine

Abstract

Brocht, Donna M., John P. McMurtry, and Norman C. Steele. 1989. An Intravenous Cannulation Technique for Swine. U.S. Department of Agriculture, Agricultural Research Service, ARS-78, 4 pp.

This publication presents a cannulation technique for serial blood sampling or the continuous infusion of substances into swine. The technique is simple, quick, and inexpensive.

Keywords: blood sampling, cannulation, continuous infusion, intravenous, swine.

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An Intravenous Cannulation Technique For Swine

Donna M. Brocht, John P. McMurtry, and Norman C. Steele

Introduction

A cannulation technique described herein enables easy serial blood sampling or the continuous infusion of substances into swine. The technique is simple, quick, and inexpensive.

Materials and Methods

Materials. The items needed for the cannulation technique are listed in table 1. Use the 0.040- x 0.070-cm Tygon tubing (item 1) to make the cannula. It should be approximately 3 feet in length; however, the length will vary depending on the size of the animal. Attach the 19-gauge tubing adaptor (item 2) and the injection cap (item 3) to one end of the tubing, and cut a slight bevel (20 degrees) at the other end of the cannula. Other items needed for this procedure include Elastikon tape (item 4), a 2.5- or 3.5-inch 13-gauge thin wall needle, (item 5), 2-0 silk with FS needle (item 6), 4-inch gauze squares, duct tape, scissors, heparinized sterile saline (item 10), Velcro stripping and light canvas material (items 11 & 12).

Make a pouch for storing the cannula during periods of nonuse, from the light canvas material (item 12). To do this, cut two 8- x 10-cm pieces and sew them together on one of the short sides and, from that seam, two-thirds the distance up the two long sides. Sew the Velcro along the unsewn edges of both inner surfaces. Make a hole on one side of the pouch so that the cannula can be pulled through it. The pouch allows easy access to the cannula while protecting the tubing from crimping or abuse.

Table 1.

Items needed for the cannulation technique

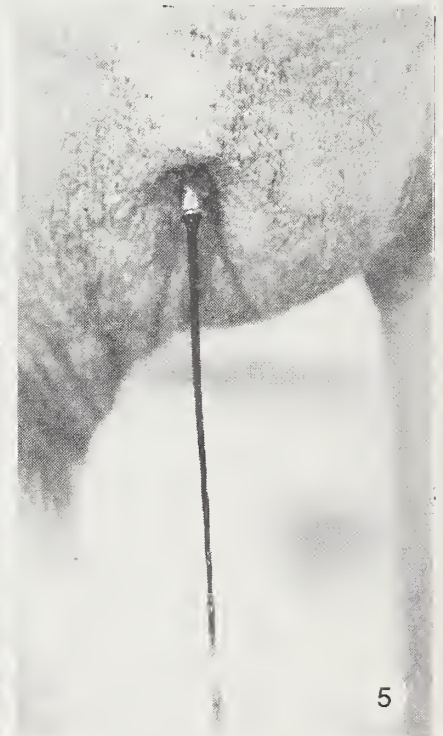
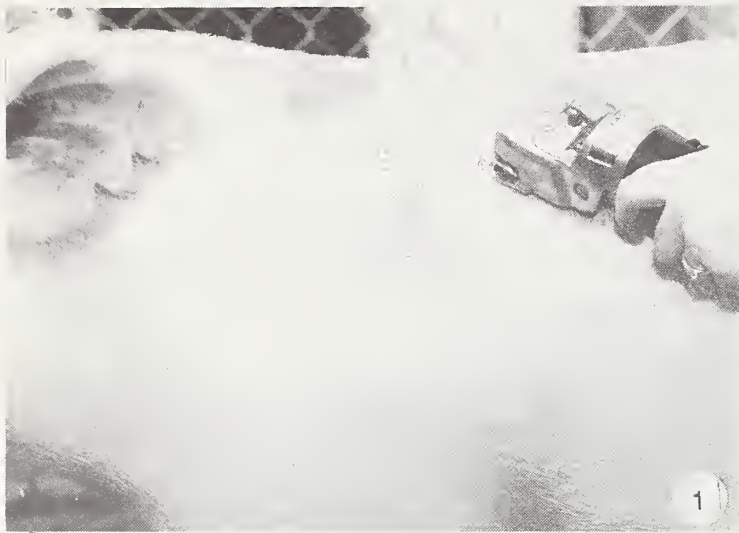
<u>Item</u>	<u>Manufacturer</u>	<u>Product identifier</u>
1. Tygon tubing	Norton Plastics & Synthetic Division	S-54-HL Micro-Bore
2. 19-gauge tubing adaptor	Becton/Dickson	# 8209
3. Injection cap	Becton/Dickson	# 6974
4. Elastikon tape	Johnson & Johnson Co.	# 5174
5. 13-gauge thin wall needle (2.5 or 3.5")	Popper & Sons	# 7400
6. Suture needle, 2-0 silk (FS Needle)	Johnson & Johnson Co.	# 685 G
7. 4" X 12-ply gauze squares	Johnson & Johnson Co.	# 7622
8. Duct tape		
9. Scissors		
10. Heparinized sterile saline sodium heparin (10 U/ml for sampling) (50 U/ml for nonuse periods)		
11. Velcro stripping	Any materials store	
12. Light canvas material	Any materials store	
13. Animal clippers		
14. Luer slip syringe		

Animal Preparation. Proper animal restraint is absolutely necessary for this procedure. We recommend using a wire snare. Not only does it effectively restrain the animal but it also helps to properly align the animal's head for insertion of the cannulation needle. A tranquilizer may be used to quiet the animal but is not required.

Position the animal so it is standing squarely on all four legs with the head extended and tilted in an upward position. The animal should not be sitting or leaning forward, as these positions change the angle of needle insertion and make the cannulation difficult.

Using animal clippers, clip the animal around the neck and on top of the neck to a point just behind

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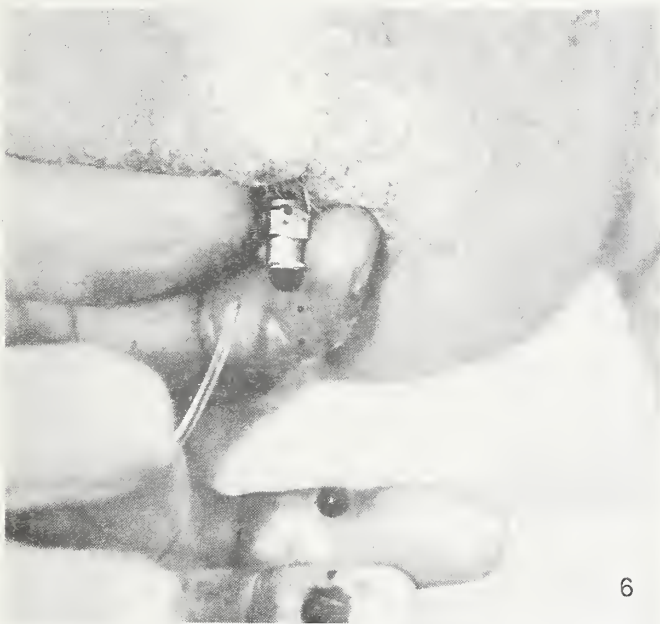
the front shoulders (fig. 1). This clipping improves the adhesion of the Elastikon tape to the skin.

Cannulation. Using a syringe, fill the prepared cannula with heparinized sterile saline (10 U/ml). Swab and wash an area around the sternum with 70% ethanol or some other antiseptic

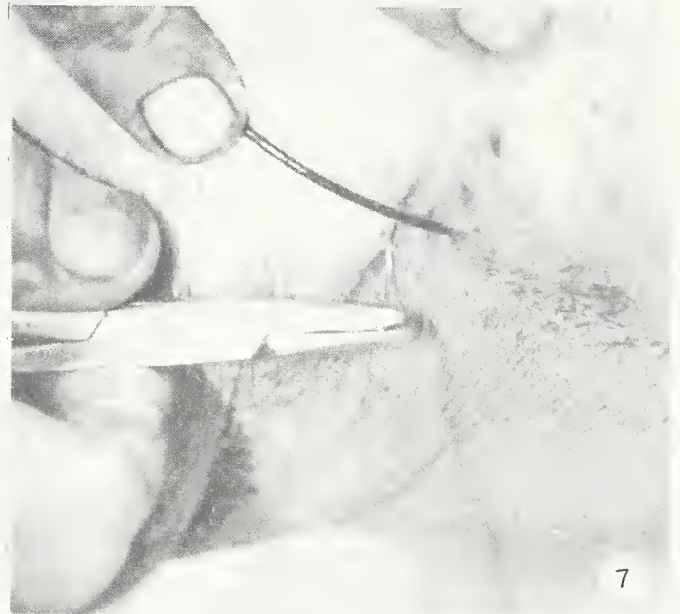
solution. Locate the point of the sternum where the cannulation needle will be inserted (fig. 2). It is critical that the needle be inserted at the proper angle and depth.

Attach a luer slip syringe to the cannulation needle. At a 45-degree angle to the sternum, insert the needle about 1 inch lateral and dorsal to the sternum

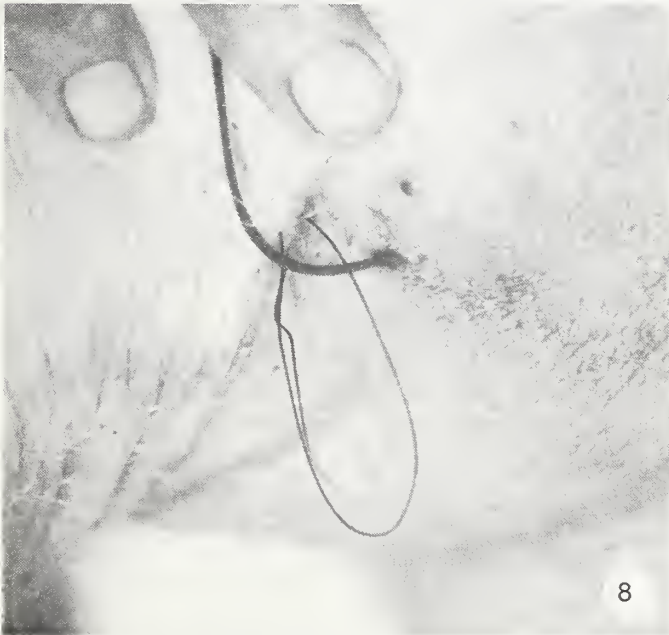
(fig. 3). When the vena cava is penetrated blood should flow freely into the syringe. A slight retraction of the syringe plunger should meet with little resistance. An example of adequate blood flow is illustrated in figures 4 and 5. It may be necessary to slightly move the needle vertically or dorsally to



6



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8



9

obtain maximum blood flow. Also, a slight rotation of the needle may make it easier to insert the cannula or to improve blood flow.

Once good blood flow is obtained, carefully detach the syringe from the needle and insert the beveled end of the cannula (fig. 6). The cannula may be inserted 10 to 15 inches, depending on the animal's size.

Blood flow in the cannula should be checked from this point on during the cannulation procedure. If it is unrestricted, hold the cannula and remove the needle. If blood flow is restricted, the cannula may be in too far. Gently pull the cannula out until blood flows easily through the cannula.

Using the suture needle and silk (item 6) suture the cannula

to the animal at the point where the cannula enters the skin (figs. 7, 8, and 9). Lidocaine or some other local anesthetic may be used before the suturing process. After tying off the suture, check the blood flow in the cannula. The suture must be tight enough to secure the cannula but not restrict blood flow in the cannula. Place a 4-inch gauze



10



11



12



13

square (item 7) over the cannula at the point of entry and secure it with 8 inches of duct tape (item 8). This provides a small patch to protect the cannula.

Place the cannula up the neck of the pig to a point on top of the neck. Secure the cannula by placing one end of the Elastikon tape (item 4) on the neck, and bring the tape up the neck to cover the cannula (fig. 10). At the top of the neck, cut a small hole in the tape and pull the cannula through (fig. 11). Continue to wrap the Elastikon tape around the neck and behind the shoulders, crisscrossing under the front legs.

Thread the cannula through the hole in the pouch (fig. 12). Place the pouch at the top of the animal's neck and wrap with tape. This secures the pouch to the animal and facilitates access to the cannula during sampling.

Again check the blood flow in the cannula. If the blood flow is unrestricted, fill the cannula with heparinized saline (50 U/ml). This solution inhibits coagulation in the cannula during periods of nonuse. If blood flow is restricted, check to ensure that the cannula is not kinked in the Elastikon tape. It may be necessary to loosen the tape, straighten the cannula, and retape

the animal. Coil the cannula in the pouch to keep it protected until sampling or infusion is initiated (fig. 13).

Prior to sampling, flush the cannula with heparinized saline (10 U/ml). If blood flow is restricted or saline infusion meets with resistance, flush again with saline. Often, resistance is due to the beveled end of the cannula lying against the vessel wall. So if flushing does not remove the restriction, pull slightly on the cannula at the point where the cannula enters the skin. This should dislodge the cannula from the vessel wall.

